

MEMORANDUM FOR RECORD

SUBJECT: Annual CIE Division 6 Meeting, Vienna, Austria

1. The meeting began at 10:00 at the Central Bureau, Vienna. The meeting was held in Vienna at the end of the International Congress on Photobiology (ICP) which met 1-6 September. Those present were

David H. Sliney (DD6, USA)
Jean-Pierre Cesarini (ADD6, F)
Laszlo Gloetzer (CH)
Jan Grzonkowski (P)
Hentsberger (for C. Ackermann) (SA)
Donald Krizek (USA)
Hans-Allen Löfberg (S)
Lucia Ronchi (I)
Harald Seidlitz (D)
Gerrit van den Beld (NL)
Janos Schanda (CB)
Christine Hermann (CB)

2. The initial business was to resolve the problem related to TC 6-13 on the plant lighting. Dr. Donald Krizek (USA) and Dr. Harald Seidlitz (D) discussed the need to reformulate the terms of reference for TC 6-13 on "Lighting Aspects of Large-Scale Plant Growing in Completely Protected Environments ('Dark Rooms')." They proposed that since Dr. Sarychev could not be reached for the past three years, and because of a US proposal to establish a different committee on research aspects of plant lighting in controlled environments, that using basically the terms of reference for TC6-13, the title be amended to include research aspects, and new chairs appointed. Dr. Krizek proposed that Dr. T.W. Tibbitts (USA) and Dr. Seidlitz be appointed as co-chairs. Dr. Schanda explained that the best administrative The new name and a slightly revised Terms of Reference would be as follows:

TC 6-42, Lighting Aspects for Plant Growth in Controlled Environments. Terms of Reference: Define the general pre-requisites for growing terrestrial plants in controlled environments and the characteristics of both commercial and research facilities. Discuss the economic constraints of commercial production facilities, and the critical optical radiation parameters for successful culture. Examine the interaction of optical radiation with other environmental parameters. Identify new and current optical sources suitable for plant culture.

3. Dr. Jean-Pierre Cesarini, Associate Director (AD) of Division 6 for photodermatology summarized the results of several TC meetings on photo-dermatology which met at the CB on Wednesday, 4 September 1996.

4. Cesarini first described the results of the final editorial meeting of TC6-26 on the division of UVB, UVA1 and UVA2. He explained that the border wavelengths of 280 and 315 nm for UVB would remain the same, and an official division of UVA1 and UVA2 would not be made at this

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time.

5. TC6-20 on Phototoxicity in Domestic and Industrial Environmental Environments also met on Wednesday and considered that the preparation of a list of phototoxic compounds had been a big task, and such a list will always be changing in time. The European Community has a Committee on this subject. A list will be completed by December in 1996, and a standardized laboratory test protocol for determining the risk of phototoxicity. The next meeting will be held in San Francisco in February 1997, and the final meeting was scheduled for Stresa, Italy in September 1997. The report should be completed by the TC in December 1997 and would be both as a hard copy and as a computer disk. He proposed that experts meet at three-year intervals to update the list.

6. With regard to TC 6-24 on Sunscreen Testing he explained that the association of cosmetic chemists, COLIPA, Brussels, Belgium, had copied the CIE standard test procedure for UVB sunscreen testing, but without credit to the CIE. He expected that the CIE would be cited in the next edition. He expected the next TC meeting to be held in conjunction with a meeting of the American Academy of Dermatology.

7. Prof. Cesarini explained that there would not likely be a report from **TC 6-28** on a standard method for several years because there are deep divisions in the scientific community on the approved method. There was some discussion about this at the International Congress on Photobiology which met in Vienna 1-6 September 1996.

7. TC 6-31 on Immediate Pigment Darkening (IPD) did not meet, but Dr. Cesarini stated that because IFTA abandoned a different IPD action spectrum, his TC could publish a postponed pigment darkening criterion that would be non-controversial. He agreed to complete the final report by December 1996.

8. There was a general discussion on melanocytic skin cancer. Dr. Cesarini explained the several epidemiological studies which showed a four-fold risk for developing malignant melanoma if childhood sunlight exposure was excessive and a 2.5-fold increase in redheads exposed at least ten times to sunbeds. It was proposed and approved to appoint JP Cesarini as a reporter R6-32 on UVA and skin cancer. It would be based upon the material presented in a workshop held at New Delhi.

9. Dr. Sliney then reviewed the list of Reporters. Dr. Cesarini recommended that R? on Skin Color be closed. Ms. Ronchi suggested closing the reporterships of Sferlazzo and Wald.

8. With regard to the remaining TCs status. TC 6-04 (Muelemans) on terminology could make progress if individual TCs submit terms required for their document and to provide to him the proper definitions. He will then submit these to the CB. Later, Hengtsberger explained that the

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proper approach was for a TC to identify a new term and submit a proposed term for the International Lighting Vocabulary to Division 7. However, van den Berg argued that there was a real need for a glossary of terms that were not as rigidly defined as in the CIE/IEC International Lighting Vocabulary. He stated that 100 rather than 1600 terms (in the last draft) would soon be proposed. Dr. Sliney applauded this development.

9. TC 6-08 (D. Kockott) on Guidelines for obtaining action spectra was still needed, but there was no status report.

10. TC 6-11 (Brainard) on systemic effects of optical radiation on humans had the problem of an overly large report. Dr. Brainard was attempting to summarize the neuro-endocrine effects and to modify his paper presented at New Delhi for this report. L. Ronchi suggesting combining TC6-11, 6-16 and 6-17; however, despite their similarity it was decided that so much work had been done in these areas and the disciplines were rather different, that they not be combined.

11. Regarding TCs 6-14 and 6-35, Dr. Sliney was awaiting figures from K. Kohmoto to complete these reports which have already been edited. It was decided to ask members for alternate figures.

12. TC 6-15. Dr. Nils Svendenius on a computerized report method for absorption and reflection in the human eye is not likely to be able to complete this project. Dave Sliney will ask Dr. Svendius if he will not resign from the chairmanship, and he would then Wesley Marshall in the US if he would provide his program and complete the project.

13. TC 6-16. D. Sliney reported that he had recently received a fax from Kuller regarding the scientific work in this area and that TC 6-16 would soon meet to discuss a draft report.

14. TC 6-17. Ms. Ronchi explained that it was not likely that her contribution could be much further reduced and she asked the DD what should be done. After a lengthy discussion on the broad aspects of spatial and temporal aspects of lighting, it was decided that the TC 6-17 be disbanded.

15. TC 6-21 (D. Sliney) on UV and Cataract made progress and some participants met at the ocular effects session of the ICP on Thursday. It now appeared that the relative contributions of UVB and UVA could be adequately explained in the text.

16. TC 6-23 (Donald Krizek) explained that work had not been completed, but he and Harald Seidlitz had discussed this at the ICP this week. He was hopeful of some progress soon.

17. Garrit van den Berg, the new Division 6 representative from the Netherlands suggested that there was a communication problem in Division 6. He had sent out a letter in March to all active

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24 TC chairs to ask for a status report of their TC and for a copy of the latest draft. He stated that he had received replies from 13 out of 24 active TCs; whereas, only six of the 13 had provided copies. Dr. Shanda explained that this was not the normal procedure for Division Members to receive individual reports, etc., but they received their information from progress reports in the Newsletter and from the terms of reference. They would receive reports only when the TC work was completed. Dr. Sliney explained that this was not really suggestive of a communication problem, but very often progress of some TCs took years in order to reach consensus on controversial subjects.

18. TC 6-25 on spectrally weighted daylight and photobiological action spectra still requires a chair, and D. Sliney will consult with Sasha Madronich to see if he is willing to perform this task.

19. TC 6-27 (vacant) Standardization of Erythema Action Spectrum. Alistair McKinlay had resigned this post and Dr. Sliney was looking for a successor. The task is purely clerical and requires putting Publication 106/4 into ISO format. Dr. Barth (D) had been approached for this task.

20. TC 6-29 (Peter Gies) who was expected at the D6 meeting, as he was in Vienna, and he had communicated with DD6 and said that a recently approved Australian national standard on UV transmission of fabrics would be used as the basis of the report.

21. TC 6-30 (Wong) on UV Ocular Dosimetry had produced a report on UV eye protection with a different terms of reference. This had created much confusion. D. Sliney will send a message to Prof. Wong asking about the terms of reference.

22. TC 6-33 (defabo) on photoimmunology produced a report last year that was judged to be too full of highly specialized terminology and defabo was asked and agreed to clarify some of the terminology. He explained that he was making progress on Wednesday at the ICP meeting.

23. TC 6-35 (Vincent) on UV disinfection. This report had previously been prepared based upon the earlier work of K. Kohmoto, but had not been published because of a lack of figures. Mr. Kohmoto had not responded to the request for some of his figures. Mr. van den Berg agreed to supply some germicidal lamp spectra, etc. when he received the draft report.

24. TC 6-36 (Denner) on UV shading materials. Hengstberger reported that Denner was only getting the project off the ground. He plans to hold a TC meeting next year in Durban at the time of the mid-term CIE session.

25. TC 6-37 (Sliney) on light and retinal diseases met and it was determined that too much material on animal research had been submitted and would have to be reduced prior to final

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submission.

26. TC 6-38 (Sliney) on Lamp Safety Standards. Sliney described the results of the TC meeting at the CB in May 1996. He also presented a briefing on progress in the US on an IESNA RP27 standard on the photobiological safety of lamps. The final draft was now prepared for vote within the TC.

27. TC 6-39 (Kohmoto) on UV radiation in lighted environments was new. No new information available.

28. TC 6-40 (Diffey) on a standardized erythema dose. Dr. Sliney explained that a session organized by the members of this TC was held in Vienna on Tuesday (ANNEX 2) and the committee expected to have a draft prepared shortly.

29. TC 6-41 (Weatherhead) on a UV index had now a draft report. She will circulate it shortly within the TC.

30. Under New Business, L. Ronchi suggested that a D6 Reporter be created to watch carefully all of the work of other CIE divisions and to report on areas of overlap or of D6. Hengstberger strongly agreed with this proposal. Dr. Schanda explained that this was not necessary since the Division Directors Meeting considered this aspect. Mr. Hengstberger suggested that there was still a need for a photobiologist to be constantly watching the work of other Divisions from the standpoint of D6. Dr. Schanda suggested that there were two possible approaches: that Division 6 appoint a reporter to scour the progress reports, or to rely on the current system where the DD votes on the formation of all new TCs and also

31. As another new item the Division noted the continued for an applied spectroradiometry document for photobiologists. Dr. Sliney noted that he would look into a potential TC chair, such as R. Gross USA), and make a proposal for a new TC with input from Division 2 before the next Division 6 meeting. It was decided that Dr. Sliney would discuss this at the Division Director's meeting on Sunday.

32. Hengstberger invited the Division to consider having their next annual meeting in Durban South Africa at the end of the mid-year session of the CIE on 1-3 September, 4-6 for Division meetings and TC meetings. Then on the following week (at the same time of the European Society of Photobiology in Stresa, Italy) there will be a course on radiometry. It was agreed to have the meeting on Thursday 5 September at 09:00 in Durban. It will be springtime there and Hengstberger promises spectacular weather. For those from the north american, they can stop over in Stresa after the Division meeting.

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ANNEX

TC MEETINGS AT CIE - 4 SEPTEMBER 1996 HELD AT THE CIE CENTRAL BUREAU, VIENNA

TECHNICAL COMMITTEES:

TC 6-20 PHOTOTOXICITY

PRESENT: J-P Cesarini (Chair), James Ferguson, Diane Godar, Robert Sayre, and J. Unkovic;
Observer: Robert Sayre

OBJECTIVE: To develop a method of determining if a molecule is potentially phototoxic. Can an experimental design be set? For initial screening an *in vitro* method from Lovell.

1. Draft common test procedures (Godar)
2. Assemble a current list of topicals and systemics (Unkovic)
3. Collect source information used in phototoxicity testing (Sayre)

NEXT MEETING: Amer Acad Derm in March 97 in Orlando; thence ESP, Stresa in Sept 97

TC 6-26 STANDARDIZATION OF THE TERMS UVA-1, UVA-2 AND UVB

PRESENT: Cesarini (Chair), Sliney, Urbach; Observers: Godar, Sayre

1. The final draft was approved with a few editorial changes
2. Sliney will work with CB on Friday to assure final document for circulation to National Committees

TC 6-32 Reference Photocarcinogenesis Action Spectrum

PRESENT: Donald Forbes (Chair), Janos Beers, Frank DeGruijl, Ron Ley, Fred Urbach

1. Progress made on a standard action spectrum. General agreement was made. The curve would probably be a constant (horizontal line) from about 340 to 370 or 380 nm with a dashed horizontal line to 400 nm.
2. Donald Forbes will circulate a final draft for TC approval.

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TC 6-34 Photocarcinogenesis Testing

PRESENT: Donald Forbes (Chair), Janos Beers, Frank DeGruijl, Ron Ley, Fred Urbach

1. Progress made on using the reference action spectrum in testing.

2. Donald Forbes will circulate another draft.

ANNEX 2 SESSION FOR TC 6-40

I. On Monday afternoon, a session at the ICP on defining minimal erythmal doses (MEDs) was chaired by Dr. Brian Diffey, Durham, England. The first speaker, Prof. Fred Urbach, Washington, PA, gave an overview on the history of evaluating UV skin optics and the measurement of erythema. Initially they used just perceptible minimum erythema as their endpoint. MED of Coblentz in 1931 was 360, then 398 in 1932, Hausser and Gauer 300 in 1932 and these values got lowest about 1955, then back up to 300 in 1996. Blum (1946) showed that erythema spectrum was useful but only a rough index and cannot be used as a true standard. He noted that the observational MED was "whatever it takes," whereas an instrumentally determined MED was a measured, weighted value. Some years ago Green gave an instrumental MED of 200 J/m² and this was Robertson's SU Sunburn Units which was roughly equivalent to 2000 E-vitons and 2000 Finsen-seconds.

II. Dr. James Ferguson, England, spoke of clinical differences in the determination of erythema. He explained that the MED varied with anatomical site and that systemic and topical medications can screen or increase the sensitivity (e.g., topical steroids) of particular sites. Paraffin can be used to increase the MED. Patients with solar urticaria can have a decreased UV sensitivity after administration of antihistamines. They generally used the back as the assessment site for the determination of the individual MED. He also described the numerous problems with UV meters, the optimum size of the test site, the number of increments in exposure dose. He noted that age did not appear to make much difference in MED determination. The assessment of erythema depended upon the definition of the criteria, e.g., either "barely perceptible" vs. "well defined margins." The ambient lighting and the time post-exposure evaluation will also affect assessment. He was not so concerned about the light source used, fluorescent or incandescent provided there was a fair amount of green light present and the same source was used consistently by the dermatologist. In the discussion of the paper, it was pointed out that their normal time of assessment was about 24 hours. The FDA criterion was 24-28 hours as Dr. Hans-Christian Wulf remembered. Regarding erythmal redness measurements, he felt that the human eye was still better than the instruments for measuring "just detectable," but the skin reflectance instruments were better at providing degrees of additional redness.

III. Prof. Hans-Christian Wulf, Copenhagen, Denmark, argued for a standardized erythmal dose unit. Amongst photodermatologists, he noted, that dermatologists generally had trouble understanding the concept of a "standardized MED" for assessment of a UV source. Dermatologists use the MED as the threshold for erythema for each individual at a given skin site; whereas, the lamp industry, physicists, et al used an MED as an actual dosimetric unit for the assessment of the erythmal potential for a given source and source spectrum. He proposed that the standardized MED be termed the SED--the Standardized Erythmal Dose. To derive such a unit, agreement would have to be made on the action spectrum to be used, the chosen

population (he preferred skin type I in previously unexposed normal skin of the buttock. The degree of redness would have to be agreed upon as well. He argued that the advantages of the SED would be that the same number of SEDs would be required for treatment from different lamps; that patients could be readily transferred from one treatment source to another; that the number of SEDs to give 1 MED is an enumeration of the individual's photoprotection directly related to the group of most sensitive persons. Furthermore the constitutive photoprotection would be the SEDs required to give a defined erythematous reaction on previously unexposed buttock skin, and this would be useful in epidemiology. In the discussion which followed, Dr. Robert Sayre, Memphis, TN, strongly questioned the idea that all parts of the UV spectrum would add in accordance with a single action spectrum and he gave as an example a UVC source at 254 nm and a UVB or UVA source.

IV. Dr. Brian Diffey, Durham, England, explained the concepts of weighting the spectral irradiance of incident irradiation with the erythematous effectiveness would produce the erythematous effective irradiance, which he termed "erythematous effectiveness. The Erythematous dose after exposure of t seconds was just the effectiveness multiplied by the time. He then gave an overview of early erythematous action spectra from Hausser and Vahle, Coblentz and others who used discrete lines of the mercury lamp spectrum; whereas, in the 1960s others using xenon-arc monochromators obtained slightly different action spectra. This led to the proposed standardized action spectrum of McKinlay and Diffey which was adopted by the CIE a few years ago. More recently, he has used the CIE with narrow band sources and found that the actual MEDs were just slightly below for 370 and 400 nm. He noted that the 1995 laser-produced action spectrum of Anders et al was somewhat steeper in the 300-320 nm band, but he felt the fit was not that bad. He then used the CIE curve and the Anders curve to determine an MED for a variety of different lamps and the solar spectrum and the comparison gave a slope of nearly 1.0 and showed a 95% confidence interval was 0.89-1.04 for wavelengths between 294 and 374 nm. Fred Urbach showed that using this approach, a factor of difference existed in the 320-340 nm band of about 2 times, fairly close (3,700 vs 4,200 J/m²) for the entire UV solar spectrum from 290 to 400 nm. The SCUP UV carcinogenesis curve integrals differed far more.

V. Dr. N. Mortensen, Copenhagen, described a series of studies to determine the lower limit of UVB dose to achieve erythema. They used 27 very sensitive persons of skin type I and exposed both buttocks to a xenon-arc source. they found a minimal dose of 14.7 mJ/cm² with a range from nearly 10 to 20. In a second study, they evaluated 21 persons of skin types I-IV and used 8 doctors to evaluate the phototest using the same exposure regimen. The inter-observer agreement was best for the lower doses and the more sensitive skin types. They concluded that the barely perceptible erythema had the highest agreement and the minimal dose was 10 mJ/cm² and he recommended 1 SED = 10 mJ/cm² (100 J/m²).

VI. Dr. Christian T. Jansen, Turku, Finland, discussed the possible names for an SED. Should it be named after Blum or Urbach, or some person of note? Should it have a more general name

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such as erythema unit? From past discussions within the Scandinavian dermatologic community, he strongly recommended the Standard Erythema Unit. There was an extensive discussion which followed. David Sliney, Director of CIE Division 6 on Photobiology stated that he supported the concept of a dose unit, but was somewhat concerned about the assumption that two lamp sources with the same SED would produce the same effects desired clinically, since the waveband between approximately 305 and 315 nm was both quite penetrating to the germinative layer of the epithelium and yet of sufficiently short wavelengths to have photon energies quite capable of damaging DNA directly, and such a source would have quite a different clinical outcome compared with a largely UVC source or a largely UVA source in all likelihood. Secondly, he was concerned about the calculation presented by Fred Urbach, showing that the 300-320 nm band effective irradiance using the CIE erythema and the laser-generated action spectrum differed by a factor of two in SED. This was due to the more shallow slope of the CIE curve since McKinlay and Diffey used data obtained with a monochromator of finite bandwidth (e.g., 5 nm). Depending upon how the spectrum of a future light source was measured, this type of error could show up. Brian Diffey explained that the conclusions of this symposium would serve as the basis for the proposals to be generated by CIE Technical Committee TC 6-41. A straw poll taken amongst those attending the meeting showed strong support for the concept and even a majority vote in favor of the 10 mJ/cm² reference level.